

LITERATURE.

Mr. Donisthorpe has very kindly collected for me all the references quoted in this paper.

Donisthorpe, *Ent. Rec.*, 26, 136 (1914).

„ *British Ants*, 323 (1915).

„ *Ent. Rec.*, 27, 258-259 (1915); 29, 31 (1917); 30, 22 (1918); 31, 1 (1919).

Santschi, *Bull. Soc. Vand. Sci. Nat.*, 53, 175-178 (1920).

Viehmeier, *Arch. Naturg.*, 81, 111 (1915),

„ *Ent. Mit.*, 6, 71 (1917).

Wheeler, *Bull. Amer. Mus. N.H.*, 19, 65-8-83 (1903); 48, 49-56 (1914).

„ *Psyche*, 26, 2-5 (1919).

Some records of, and observations on, the Flying-habit of Butterflies when paired.

By B. C. S. WARREN, F.E.S.

During the last few years many interesting notes on the flying-habits of butterflies when paired, have appeared in the *Entomologist's Record*; and having myself, in the same period, made observations on seventy-nine pairs belonging to forty-four species of butterflies, I naturally was much interested in comparing other collectors' records with my own. In the June number of 1917, Mr. C. W. Colthrup suggests that certain species exhibit different habits on the Continent and in England. I may note at once that this is not so, but only a misconception arising from a want of sufficient data.

Some very interesting observations of Donzel's, written in 1837, were given by Mr. H. J. Turner (*Ent. Rec.*, vol. xxviii. p. 88.) In these Donzel advocates the theory that the carrying habit is the same for all the species of a genus, and is therefore a valuable characteristic in determining the limits of genera. All my observations, and the records I have seen, have given such complete confirmation of this theory, that in the future should any apparent exception be noted, I should feel no doubt that it was merely our conception of the genus in question which was at fault. The fact that there are some few species in which both sexes are able to carry, is not the least antagonistic to the theory; it being merely the case that all the species of the genera concerned, exhibit this unusual habit. It may well be though, that this habit is more general than is at present known, only we have not sufficient data to establish the fact.

The following are the instances which have come under my observation; in each case notes were taken on the spot and not trusted to memory.

Genus *Erynnis*.

E. lavaterae, observed once. At Vernayaz, Valais. July 7th, 1917. ♀ carried ♂.

Genus *Hesperia*.

H. ryffელensis, observed once. On the Parpaner-Rothorn, Grisons. August 8th, 1919. ♀ carried ♂.

H. serratulæ, observed once. In the Val Sporz, Lenzerheide, Grisons. July 12th, 1919. I took a pair, but unfortunately they

separated before I could induce them to fly. The ♀ kept its wings open and showed an inclination to crawl about, the ♂ keeping its wings folded tightly. (Suggests that the ♀ would carry.)

Genus *Nisoniades*.

N. tages, observed three times. At Follaterre, Valais. July 29th 1916. ♀ carried ♂. At Caux, Vaud. June 1st, 1917. ♀ carried ♂. In the Stockenwald, Kandersteg, Bernese Oberland. May 22nd 1918. ♀ carried ♂.

Genus *Chrysophanus*.

C. hippothoë var. *eurybia*, observed once. At Lenzerheide, Grisons. July 19th, 1919. ♀ carried ♂.

Genus *Loweia*.

L. subalpina, observed once. At Spoina, Lenzerheide, Grisons. July 4th, 1919. ♂ carried ♀.

Genus *Rumicia*.

R. phlaeas, observed once. At Vernayaz, Valais. August 22nd, 1916. ♀ carried ♂.

Genus *Lycaena*.

L. arion, observed once. In the Ueschinen Tal, Bernese Oberland. June 13th, 1918. ♀ carried ♂.

This is very interesting in view of the fact that among all the "blues" (with one other exception, so far as is at present known) the ♂ carries. Records of the habits of *arcas*, *euphemus*, *alcon*, *melanops* and *iolas* would be most instructive.

Genus *Cupido*.

C. sebrus, observed once. At Follaterre, Valais. May 9th, 1916. ♂ carried ♀.

Genus *Everes*.

E. alcitas, observed twice. At Branson, Valais. May 18th, 1916. ♂ carried ♀. July 29th, 1916. ♂ carried ♀.

Genus *Glaucopsyche*.

G. cyllarus, observed once. By the Gryonne River, St. Triphon Vaud. May 2nd, 1916. ♂ carried ♀.

Genus *Cyaniris*.

C. semiargus, observed once. In the Ueschinen Tal, Bernese Oberland. June 30th, 1918. ♀ carried ♂. The only "blue" beside *arion* as yet recorded with the ♀ carrying.

Genus *Aricia*.

A. eumedon, observed once. At Masons, Lenzerheide, Grisons. July 3rd, 1919. I took a pair but could not make them fly. While falling to the ground after being thrown into the air, the ♀ expanded her wings, but did not try to fly, the ♂ did not move. Is this another "blue" species of which the ♀ carries? Unfortunately I have not had the good fortune to observe *medon* or *donzelii*.

Genus *Hirsutina*.

H. damon, observed once. Between Solis and Obervatz, Grisons. July 31st, 1919. ♂ carried ♀.

Genus *Agriades*.

A. coridon, observed five times. At Champéry Valais. July 11th, 1915. ♂ carried ♀. 26th, 1915. ♂ carried ♀. 28th, 1915. ♂ carried ♀. At Eclépens, Vaud. August 16th, 1915. ♂ carried ♀. In the Ueschinen Tal, Bernese Oberland. July 19th, 1918. ♂ carried ♀.

A. thetis, observed once. At Lenzerheide, Grisons. June 28th, 1919. ♂ carried ♀.

Genus *Polyommatus*.

P. icarus, observed five times. At Follatterre, Valais. May 9th, 1916. ♂ carried ♀. At Branson, Valais. May 9th, 1916. ♂ carried ♀. 18th, 1916. ♂ carried ♀. At Follatterre, Valais. July 18th, 1916. Two pairs observed, ♂ carried ♀ in each case.

P. hylas, observed four times. At Verossaz, Valais. June 23rd, 1916. ♂ carried ♀. At Masons, Lenzerheide, Grisons. July 5th, 1919. ♂ carried ♀. 6th, 1919. ♂ carried ♀. Val Sporz, Lenzerheide, Grisons. July 12th, 1919. ♂ carried ♀.

Genus *Latiiorina*.

L. orbitulus, observed four times. Val Sporz, Lenzerheide, Grisons. July 11th, 1919. Three pairs observed. ♂ carried ♀ in each case. At Masons, Lenzerheide, Grisons. July 17th, 1919. ♂ carried ♀.

Genus *Parnassius*.

P. apollo, observed once. In the Ueschinen Tal, Bernese Oberland. July 9th, 1918. Found a pair but was unable to make them fly. When in the grass the ♀ crawled about dragging the ♂, which remained immovable. It is therefore probable that the ♀ carries should they fly.

Genus *Aporia*.

A. crataegi, observed eight times. At Branson, Valais. May 21st, 1915. ♀ carried ♂. At Sion, Valais. May 25th, 1915. Four pairs observed. ♀ carried ♂ in each case. At Eclépens, Vaud. June 2nd, 1916. Three pairs observed. ♀ carried ♂ in each case. This suggests a closer connection with *Parnassius* than with *Pieris*.

Genus *Pieris*.

P. napi var. *bryoniae*, observed once. In the Ueschinen Tal, Bernese Oberland. June 30th, 1918. ♂ carried ♀.

P. manni, observed once. At Vernayaz, Valais. July 10th, 1914. ♂ carried ♀.

Genus *Dryas*.

D. paphia, observed twice. At Vernayaz, Valais. July 7th, 1917. ♀ carried ♂. Between Aigle and Sépey, Vaud. July 12th, 1917. I saw a pair in flight, but could not catch them. ♀ carried ♂ I should say, but I could not be certain. Previous records leave no doubt that both sexes can carry in this genus, as they can in the following.

Genus *Argynnis*.

A. aglaia, observed three times. Val Sporz, Lenzerheide, Grisons. July 22nd, 1919. ♂ carried ♀. 28th, 1919. ♂ carried ♀. August 2nd, 1919. ♀ carried ♂. This establishes the fact that both sexes of this species can carry; previous records have only noted the ♀ as carrying.

A. niobe, and var. *eris*, observed once. In the Ueschinen Tal, Bernese Oberland. July 9th, 1919. I took a pair. The ♂ type, and the ♀ var. *eris*. On liberating them the ♂ carried ♀. On starting them a second time the ♂ again flew; but they fell into some long grass where I found both struggling. Subsequently the ♀ crawled up a grass stem and took to flight for a short distance. On my reaching them for the fourth time the ♀ again flew, and this time so far that I was unable to find them again.

Var. *eris*, both sexes, observed once. At Follatterre, Valais. June 16th, 1915. ♀ carried ♂. Mr. Turner's and the late Mr. Tutt's records, have already shown that both sexes of *niobe* could carry; but the above note is, I think, the first record of both sexes of a given pair flying alternately. Of *cydippe* Mr. Wheeler has recorded the ♀ carrying (*Ent. Rec.*, vol. xxviii., p. 204), and Dr. Dixey that the ♂ can carry (*Proc. Ent. Soc. Lond.*, 1915). So this habit is common to all three species.

Genus *Breuthis*.

B. euphrosyne, observed once. At Lenzerheide, Grisons. June 13th, 1919. I found a pair at rest, but failed to make them fly. When thrown in the air the ♀ fluttered her wings slightly, the ♂ remaining still. On the ground both made endeavours to walk, the ♀ being the most animated. (Suggests that ♀ would carry if flight took place.)

B. ino, observed once. At Lenzerheide, Grisons. July 26th, 1919. Unfortunately separated before flying.

Genus *Melitaea*.

M. athalia, observed once. At Eclépens, Vaud. June 2nd, 1916. ♀ carried ♂.

M. didyma, observed twice. At Follatterre, Valais. July 29th, 1916. ♀ carried ♂. At Vernayaz, Valais. July 7th, 1917. ♀ carried ♂.

Genus *Pararge*.

P. hiera, observed once. At Kandersteg, Bernese Oberland. June 13th, 1918. ♀ carried ♂.

P. maera, observed once. At Salvan, Valais. July 1st, 1916. ♀ carried ♂.

P. megera, observed once. At Eclépens, Vaud. August 16th, 1915. ♀ carried ♂.

Genus *Euodia*.

E. dryas, observed twice. At Eclépens, Vaud. August 7th, 1916. ♀ carried ♂. August 14th, 1918. ♀ carried ♂.

Genus *Epinephele*.

E. jurtina, observed once. At Sierre, Valais. June 12th, 1915. ♀ carried ♂.

E. tithonus, observed once. At Eclépens, Vaud. August 7th, 1916. ♀ carried ♂.

Genus *Coenonympha*.

C. satyrion, observed once. At Masons, Lenzerheide, Grisons. June 29th, 1919. ♀ carried ♂.

C. tiphon, observed once. At Masons, Lenzerheide, Grisons. July 17th, 1919. ♀ carried ♂.

Genus *Erebia*.

E. oeme, observed twice. In the Ueschinen Tal, Bernese Oberland. July 7th, 1918. Two pairs observed. ♀ carried ♂ in each case.

E. manto, observed twice. At Champéry, Valais. July 29th, 1915. Two pairs observed. ♀ carried ♂ in each case.

E. euryale, observed once. At Champéry, Valais. July 20th, 1915. ♀ carried ♂.

E. aethiops, observed once. In the Ueschinen Tal, Bernese Oberland. July 22nd, 1918. ♀ carried ♂.

E. gorge, observed three times. On the Grammont, Valais. July 19th, 1917. Two pairs observed. ♀ carried ♂ in each case. Urden Fürkli, Grisons. August 8th, 1919. ♀ carried ♂.

Genus *Melanargia*.

M. galathea, observed three times. At Champéry, Valais. July 8th, 1915. ♀ carried ♂. 9th, 1915. ♀ carried ♂. 11th, 1915. ♀ carried ♂.

It will be noticed, if looking over the last six genera mentioned, that in the case of every Satyrid species noted, the ♀ carries. Also of all previous records, all except two, give this result. It is, therefore, of particular interest to enquire into those two cases. The first is a note of the late Mr. Tutt's, quoted by Mr. Colthrup (*Ent. Rec.*, vol. xxix. p. 17), which states that the ♂ of *M. galathea* always carries the ♀. If this is so, then *Melanargia* is a third genus in which we find both sexes carrying. In view, however, of the considerable amount of data available on Satyrid species, I cannot help wondering if this record is the result of a *lapsus calami*; or perhaps a printer's error. Possibly some of Mr. Tutt's personal friends could throw some light on the matter.

The second instance was a casual statement in the course of other remarks by Dr. Verity (*Ent. Rec.* 1919, p. 68), that the ♂ *S. circe* carried the ♀. I wish Dr. Verity would let us know if this is the result of personal observation, or merely a quotation; if the latter, was the source one to be relied on? In this case should Dr. Verity confirm the record, not having any other data of the habits of this species, we must await further observations to ascertain if both sexes can carry in the genus *Satyrus*, or only the ♂. This last seems most improbable, but of course it may be so; it is even possible that a small section composed of *S. circe* and those species most closely connected to it, may have developed this habit independently of the other species.

Any one who has read this paper must have noticed how fragmentary our knowledge of these flying-habits is, and how much further records are to be desired. To obtain such records is, however,